be agitated here, and petitions will be forwarded to Parliament, praying for a sanitary bill, when the government measure is introduced next month.

THE CURVE OF GOTHIC ARCHITECTURE.

Sir,—It is gratifying to witness the success that so frequently attends the efforts of our contemporary artists to imitate the structures of mediæval antiquity. I would fain hope that the spirit of the ancient masters is often discernible in their modern pupils. That spirit, which seems not only to assert its presence beneath the fretted canopy of the elaborated cathedral, but to invest with mysterious influence even a fragmental arch in the solitude of ruin.

We have studied much this glorious style, and yet, how vague have been our notions concerning the curve of the pointed arch! that prominent and essential feature. While all acknowledge its simplicity and grace, and perceive the impress of regular and uniform law in its construction — admire the fine flow of its almost parabolic lines, projected from the firmness of its base, to the airy aspiration of its summit—yet, how often is this uniformity violated, and this gracefulness degenerated, sometimes into the tameness of a circular arc, and sometimes into the deformity of a deflection, produced (to use your own forcible expression) by "rule of thumb!"

The arch under consideration is composed of two curve lines, meeting at the apex, and having their tangents at the base perpendicular to the horizon; which curves, for an obvious reason, I would call *monastic*; and I hope to shew that they have their ordinates and abscissæ related to their co-radii by a law as uniform as that which governs the parabola or ellipsis, or any other curve of equation.

It has been usual, when the height of the arch exceeds half its breadth, to consider the curve as struck with a single radius. But, let any one examine our best churches, and he will perceive that the curve has more point at the apex and greater perpendicularity at the base than the single arc of a circle could produce.

In the hope of correctness, but with deference to greater names, I propose the following theorems, in the character rather of a mathematician than of an architect.

1. The monastic curve is always struck with the radii of two unequal circles. Let the minor radius equal r, and the major equal $r + s$.

2. The minor radius projects the lower portion of the curve, and is always a mean proportional between the height, or rectangular ordinate y, and the chord joining the apex and base. The value of this chord, taking the half-width or abscissa to equal x, is, by the well-known property of the right-angled triangle, $\sqrt{x^2 + y^2}$. Hence $r = \frac{y^2}{\sqrt{x^2 + y^2}}$.

3. The complement s, or difference between the two radii, has with the abscissa the same ratio that the chord has with the ordinate: that is, $s : x :: \sqrt{x^2 + y^2} : y$. Whence, $s = \frac{x}{y}\sqrt{x^2 + y^2}$.

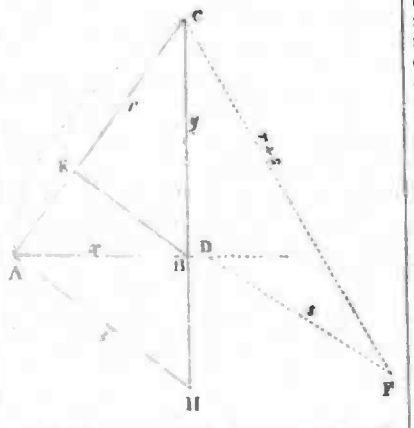
4. The product of the minor radius and the complement is always equal to the product of the abscissa and ordinate: that is, $rs = xy$.

These equations may be geometrically projected with the circle and parabola; the monastic curve having a convexity between these two sections of the cone.

Moreover, those of your readers who prosecute the higher calculus, will here find ample scope for investigation. I would remind such that y is the limit of r to which it approaches as x vanishes: and also that when y vanishes, s becomes infinite. Likewise, that the ratio of $(r : s)$ is always that of $(y^2 : x^2 + xy^2)$; and other fluxional analogies will repay the student.

But it may be objected, all this would imply greater analytical proficiency than it is reasonable to suppose the monks ever possessed. I reply, that, whatever the attainments of the ecclesiastics may have been—and they monopolised nearly all the intellect of the day—they might be well versed in the practical application of the following simple diagram, without knowing all the consequences that might thence be deduced by subsequent mathematicians.

I omit, at this time, the demonstration of the foregoing theorems for two reasons: first, because an analyst will find them almost self-evident; and secondly, because every practical man will at once apprehend the annexed construction, with which, I doubt not, the monks were perfectly familiar.



N.B. The centre of the lower arc is at D, and of the upper, at F. AD = r, is on AB, produced if necessary.

Let AB be the half-width, and BC the height of the arch. Produce CB and join CA, to which last line draw the perpendiculars EB and AH.

Then will EC be the minor radius

$$\left(= r = \frac{BC^2}{AC} = \frac{y^2}{\sqrt{x^2 + y^2}}\right);$$

and AH will be the complement

$$\left(= s = \frac{AB \times AC}{BC} = \frac{x}{y}\sqrt{x^2 + y^2}\right)$$

calling AB = x, and BC = y.

We may take x of any value in respect of y: so that the commonly called Lancet, Equilateral, and Tudor forms, are only accidents of one curve of equation, whose elements are expressed thus:—

$$\frac{x}{y}\sqrt{x^2 + y^2} = \frac{xy}{r} = s.$$

Allow me to add, that, other than this, I am not aware that any formula has been promulgated for describing a Tudor arch with a given base and height.—I am, Sir, &c.,

Thomas Laker.

Wavertree, near Liverpool.

THE CAB-STAND NUISANCE.

Sir,—At this juncture, when the attention of the Legislature is happily directed to the sanitary condition of towns, is it not strange that the old and abominable system of making open stables of the streets (for such they are, in every sense of the word rendered, by the cab and coach stands) should remain intact? Had the ingenuity of man been employed for the invention of a nuisance, it could scarcely have devised one more effective than that in question.

The thoroughfare is often most inconveniently obstructed; the eye is saluted by heaps of filth and litter; by the poor horses exposed, like their bronze effigies,—happier in being devoid of the breath of life,—day and night in helpless misery to the merciless elements; by the drivers drenching and dripping, half frozen in one month, half baked by concentrated heat in another, sleeping or moping on their driving boxes, or huddled together at the gin-palace door, or collected in groups on the foot-pavement, their profane and coarse ribald gossip too often shocking the ear of the passer-by; neither is the olfactory sense without its participation in the annoyances which this detestable system engenders. It is indeed marvellous that the English, who profess so great an aversion to the effluvia of continental towns, should tolerate any thing so sickening and disgusting. The emanations from the saturated wood, or the puddles of corruption in the hollows (in too many instances large and deep) in the stone-paved streets, are unwholesome to a great degree—an untiring chemist is constantly at work to contaminate the air. Much of the soakage does not even find its way into the drains, but is dissipated only by evaporation, and even that portion which does reach this outlet is often replete with the elements of disease. Now I would suggest, Mr. Editor, that the cab-stands, like the mews, be situated out of the streets; that they be covered sheds so as to admit of the vehicles standing in readiness for immediate use. These buildings might be so constructed as to ensure thorough drainage, complete preservation of the product, and perfect ventilation, as well as to afford every comfort to man and horse, and save much disease and suffering to both. To render them easy of being found, the same plan might be adopted as the admirable one now in operation for securing this advantage to the post-offices. The vehicles might be arranged numerically, and all squabbling for precedence, now so annoying, be avoided. The entrance of each stand might be sufficiently conspicuous, and bell-handles, labelled "coach," "cab," &c. Thus, a person requiring either of these vehicles, would look for the lamp-post indicating the situation of the stand, he would signify his want by pulling the bell, and would find himself accommodated as rapidly and far more pleasantly than at present. To ladies, this system would be a great boon; it is now no uncommon spectacle to see a female applicant for a cab or coach insulted, and even insulted, by the several candidates—all alike anxious to secure the *fare*. I cannot conceive that the convenience and comfort of the public would suffer any diminution by such an arrangement, nor do I think the value of the ground necessary for the erection of the stands would form an insurmountable obstacle; its adoption would undoubtedly remove many serious annoyances and evils, promote public health, and annihilate a fertile source of sickness and suffering to the poor drivers and horses; many hours of rest and comfort might be obtained by both, and, as regards the former, many months of confinement within the walls of our hospitals might be avoided, and, I am confident, many a premature death escaped. The life of the poor men is at best sufficiently miserable; at least, let it be divested of its worst horrors (is this term too strong?) the needless, protracted, wearisome exposure, night and day, to all the changes of this trying climate, in that state of post-like inaction which stagnates every energy of mind and body and chills the very blood, for the relief of which the hard-earned coin goes to the gilded palace of iniquity, instilling disease into the vitals of its victim, his home too often remaining a scene of abject poverty and distress.

I am, Sir, &c., F. H. Waller.

THE IRON TRADE.

The sudden suspension of the railway works, in progress and projected, and the general panic in commercial affairs, have led to what is now regarded as an 'extraordinary crisis' in the fluctuating health and fortunes of the iron trade; and at the recent quarterly meetings of the masters, although it is admitted—even by those who had previously insinuated to the contrary—that "the settlement of accounts has been generally punctual," scarcely a single new order, even for a ton of iron, has been received; and even if there had been, the almost universal determination of the workmen to resist what they conceive to be an undue or excessive reduction of wages, and the consequent blowing out, and total stand-still, of almost "all the furnaces and works of every proprietor in South Staffordshire, Shropshire, and elsewhere, now in progress, would have made the "manufacturers gladly avail themselves of these difficulties to evade orders, which, if taken, it seemed by no means certain how far they could be executed in any given time, or without serious loss." In short, the usual spirit and energy displayed by the 'great masters,' in their measures for the upholding of the stamina of their body corporate, were evidently at a low ebb, since it is declared by one of their chief organs of the press that they did nothing but "feel each other's pulse." The *tonic* felt to be wanted in such a state of prostration, however, was by no means one of iron, however excellent; though "neither a pre-

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